# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

| Applicant's or agent's file reference<br><br>APLEP0040PCT | **FOR FURTHER<br>ACTION** | see Form PCT/ISA/220<br>as well as, where applicable, item 5 below. |
|---|---|---|
| International application No.<br><br>PCT/US2004/000316 | International filing date *(day/month/year)*<br><br>07/01/2004 | (Earliest) Priority Date *(day/month/year)*<br><br>08/01/2003 |
| Applicant<br><br>APPLE COMPUTER, INC. | | |

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of _____7_____ sheets.

[X]   It is also accompanied by a copy of each prior art document cited in this report.

1.  **Basis of the report**

    a.  With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
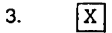
    [ ]   The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

    b.  [ ]   With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2.  [ ]   **Certain claims were found unsearchable (See Box II).**

3.  [X]   **Unity of invention is lacking (see Box III).**

4.  With regard to the **title,**

    [X]   the text is approved as submitted by the applicant.

    [ ]   the text has been established by this Authority to read as follows:

5.  With regard to the **abstract,**

    [X]   the text is approved as submitted by the applicant.

    [ ]   the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6.  With regards to the **drawings,**

    a.  the figure of the **drawings** to be published with the abstract is Figure No. ___3_____

    [ ]   as suggested by the applicant.

    [X]   as selected by this Authority, because the applicant failed to suggest a figure.

    [ ]   as selected by this Authority, because this figure better characterizes the invention.

    b.  [ ]   none of the figures is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (January 2004)

# INTERNATIONAL SEARCH REPORT

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**Box II   Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
   because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
   because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
   because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

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**Box III   Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

        see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest**

☐ The additional search fees were accompanied by the applicant's protest.

☒ No protest accompanied the payment of additional search fees.

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Form PCT/ISA/210 (continuation of first sheet (2)) (January 2004)

**FURTHER INFORMATION CONTINUED FROM    PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-12

   Method for coding mode selection using Lagrangian rate distortion optimization that puts more emphasis on the distortion than the rate and such that the distortion reduces the effects of outliers.

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2. claims: 13-19

   Method for coding mode selection using Lagrangian rate distortion optimization with clustering of the Lagrangian values.

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# INTERNATIONAL SEARCH REPORT

**A. CLASSIFICATION OF SUBJECT MATTER**
IPC 7   H04N7/26

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)
IPC 7   H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | WIEGAND T ET AL: "Lagrange multiplier selection in hybrid video coder control" PROCEEDINGS 2001 INTERNATIONAL CONFERENCE ON IMAGE PROCESSING. ICIP 2001. THESSALONIKI, GREECE, OCT. 7 - 10, 2001, INTERNATIONAL CONFERENCE ON IMAGE PROCESSING, NEW YORK, NY : IEEE, US, vol. VOL. 1 OF 3. CONF. 8, 7 October 2001 (2001-10-07), pages 542-545, XP010563403 ISBN: 0-7803-6725-1 | 7,10 |
| Y | abstract | 1-4,8,9 |
| A | paragraphs '0002! - '0004! | 5,6,11, 12 |

-/--

| X | Further documents are listed in the continuation of box C. | | X | Patent family members are listed in annex. |
|---|---|---|---|---|

° Special categories of cited documents :

'A' document defining the general state of the art which is not considered to be of particular relevance

'E' earlier document but published on or after the international filing date

'L' document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

'O' document referring to an oral disclosure, use, exhibition or other means

'P' document published prior to the international filing date but later than the priority date claimed

'T' later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

'X' document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

'Y' document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

'&' document member of the same patent family

Date of the actual completion of the international search

20 August 2004

Date of mailing of the international search report

0 1. 10. 2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL – 2280 HV Rijswijk
Tel. (+31–70) 340-2040, Tx. 31 651 epo nl.
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Authorized officer

Georgiou, G

Form PCT/ISA/210 (second sheet) (January 2004)

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**C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| Y | MEI-YIN SHEN ET AL: "Fast compression artifact reduction technique based on nonlinear filtering" CIRCUITS AND SYSTEMS, 1999. ISCAS '99. PROCEEDINGS OF THE 1999 IEEE INTERNATIONAL SYMPOSIUM ON ORLANDO, FL, USA 30 MAY-2 JUNE 1999, PISCATAWAY, NJ, USA,IEEE, US, 30 May 1999 (1999-05-30), pages 179-182, XP010341158 ISBN: 0-7803-5471-0 paragraphs '0002!, '03.3!; table 1 | 1-4,8,9 |
| A | SCHWARZ H ET AL: "An Improved H.26L Coder Using Lagrangian Coder Control" ITU TELECOMMUNICATIONS STANDARDIZATION SECTOR STUDY GROUP 16, XX, XX, 18 October 2001 (2001-10-18), pages 1-8, XP002268624 the whole document | 1-12 |
| A | SEGALL C A ET AL INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS: "PRE- AND POST-PROCESSING ALGORITHMS FOR COMPRESSED VIDEO ENHANCEMENT" CONFERENCE RECORD OF THE 34TH. ASILOMAR CONFERENCE ON SIGNALS, SYSTEMS, & COMPUTERS. PACIFIC GROVE, CA, OCT. 29 - NOV. 1, 2000, ASILOMAR CONFERENCE ON SIGNALS, SYSTEMS AND COMPUTERS, NEW YORK, NY : IEEE, US, vol. VOL. 2 OF 2. CONF. 34, 29 October 2000 (2000-10-29), pages 1369-1373, XP001004077 ISBN: 0-7803-6515-1 paragraph '03.3! | 1-12 |
| A | SEUNGJOON YANG ET AL: "Blocking effect removal using regularization and dithering" IMAGE PROCESSING, 1998. ICIP 98. PROCEEDINGS. 1998 INTERNATIONAL CONFERENCE ON CHICAGO, IL, USA 4-7 OCT. 1998, LOS ALAMITOS, CA, USA,IEEE COMPUT. SOC, US, 4 October 1998 (1998-10-04), pages 415-419, XP010308748 ISBN: 0-8186-8821-1 paragraph '0004! | 1-12 |

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# INTERNATIONAL SEARCH REPORT

**C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | MEI-YIN SHEN ET AL: "Real-time compression artifact reduction via robust nonlinear filtering" IMAGE PROCESSING, 1999. ICIP 99. PROCEEDINGS. 1999 INTERNATIONAL CONFERENCE ON KOBE, JAPAN 24-28 OCT. 1999, PISCATAWAY, NJ, USA,IEEE, US, 24 October 1999 (1999-10-24), pages 565-569, XP010368932 ISBN: 0-7803-5467-2 paragraph '0002! | 1-12 |
| P,X | DUMITRAS A ET AL: "Enhancement of direct mode selection in B pictures for bit rate reduction of compressed video sequences" IMAGE PROCESSING, 2003. PROCEEDINGS. 2003 INTERNATIONAL CONFERENCE ON, vol. 3, 14 September 2003 (2003-09-14), pages 825-828, XP010669961 the whole document | 1-12 |
| A | KOSSENTINI F ET AL: "PREDICTIVE RD OPTIMIZED MOTION ESTIMATION FOR VERY LOW BIT-RATE CODING" IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS, IEEE INC. NEW YORK, US, vol. 15, no. 9, 1 December 1997 (1997-12-01), pages 1752-1763, XP000726013 ISSN: 0733-8716 paragraph 'OIII!; figure 4 | 13-19 |
| A | US 6 493 385 B1 (HASEGAWA YURI ET AL) 10 December 2002 (2002-12-10) column 8, line 13 - line 31; figure 4 | 13-19 |
| A | EP 1 170 954 A (MITSUBISHI ELECTRIC CORP) 9 January 2002 (2002-01-09) paragraphs '0082! - '0087!; figure 7 | 13-19 |
| A | ZHU Q-F ET AL: "Image reconstruction for hybrid video coding systems" DATA COMPRESSION CONFERENCE, 1992. DCC '92. SNOWBIRD, UT, USA 24-27 MARCH 1992, LOS ALAMITOS, CA, USA,IEEE COMPUT. SOC, US, 24 March 1992 (1992-03-24), pages 229-238, XP010027544 ISBN: 0-8186-2717-4 page 234, line 7 - line 10 | 13-19 |

Form PCT/ISA/210 (continuation of second sheet) (January 2004)

# INTERNATIONAL SEARCH REPORT

Information on patent family members

| Patent document cited in search report | | Publication date | Patent family member(s) | | Publication date |
|---|---|---|---|---|---|
| US 6493385 | B1 | 10-12-2002 | WO | 9922525 A1 | 06-05-1999 |
| EP 1170954 | A | 09-01-2002 | US | 6493386 B1 | 10-12-2002 |
| | | | AU | 3054701 A | 20-08-2001 |
| | | | EP | 1170954 A1 | 09-01-2002 |
| | | | WO | 0160075 A1 | 16-08-2001 |
| | | | US | 6490320 B1 | 03-12-2002 |
| | | | US | 6574279 B1 | 03-06-2003 |

# PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

| To: | PCT |
|---|---|
| see form PCT/ISA/220 | **WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY** (PCT Rule 43*bis*.1) |

Date of mailing
*(day/month/year)*   see form PCT/ISA/210 (second sheet)

| Applicant's or agent's file reference | **FOR FURTHER ACTION** |
|---|---|
| see form PCT/ISA/220 | See paragraph 2 below |

| International application No. | International filing date *(day/month/year)* | Priority date *(day/month/year)* |
|---|---|---|
| PCT/US2004/000316 | 07.01.2004 | 08.01.2003 |

International Patent Classification (IPC) or both national classification and IPC
H04N7/26

Applicant
APPLE COMPUTER, INC.

1. This opinion contains indications relating to the following items:

   ☒ Box No. I    Basis of the opinion

   ☒ Box No. II    Priority

   ☐ Box No. III    Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

   ☒ Box No. IV    Lack of unity of invention

   ☒ Box No. V    Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

   ☒ Box No. VI    Certain documents cited

   ☐ Box No. VII    Certain defects in the international application

   ☐ Box No. VIII    Certain observations on the international application

2. **FURTHER ACTION**

   If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

   If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

   For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

| Name and mailing address of the ISA: | Authorized Officer |
|---|---|
| European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016 | Georgiou, G Telephone No. +31 70 340-2562 |

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### Box No. I    Basis of the opinion

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1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was field, unless otherwise indicated under this item.

   ☐ This opinion has been established on the basis of a translation from the original language into the following language     , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐  a sequence listing

   ☐  table(s) related to the sequence listing

   b. format of material:

   ☐  in written format

   ☐  in computer readable form

   c. time of filing/furnishing:

   ☐  contained in the international application as filed.

   ☐  filed together with the international application in computer readable form.

   ☐  furnished subsequently to this Authority for the purposes of search.

3. ☐  In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

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**Box No. II    Priority**

1. ☒    The following document has not been furnished:

    ☒    copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

    ☐    translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐    This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

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**Box No. IV    Lack of unity of invention**

1. ☒    In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:

    ☒    paid additional fees.

    ☐    paid additional fees under protest.

    ☐    not paid additional fees.

2. ☐    This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

    ☐ complied with

    ☒ not complied with for the following reasons:

      **see separate sheet**

4. Consequently, this report has been established in respect of the following parts of the international application:

    ☒ all parts.

    ☐ the parts relating to claims Nos.

**Box No. V**   Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | | |
|---|---|---|---|
| Novelty (N) | Yes: | Claims | 1-6,8,9,11-19 |
| | No: | Claims | 7,10 |
| Inventive step (IS) | Yes: | Claims | 5,6,11-19 |
| | No: | Claims | 1-4,7-10 |
| Industrial applicability (IA) | Yes: | Claims | 1-19 |
| | No: | Claims | |

2. Citations and explanations

   **see separate sheet**

**Box No. VI   Certain documents cited**

1. Certain published documents (Rules 43*bis*.1 and 70.10)

   and / or

2. Non-written disclosures (Rules 43*bis*.1 and 70.9)

   **see form 210**

Re Item III.

Re Item IV.

The separate inventions/groups of inventions are:

1-12
Method for coding mode selection using Lagrangian rate distortion optimization that puts more emphasis on the distortion than the rate and such that the distortion reduces the effects of outliers.

13-19
Method for coding mode selection using Lagrangian rate distortion optimization with clustering of the Lagrangian values.

They are not so linked as to form a single general inventive concept (Rule 13.1 PCT) for the following reasons:

The prior art has been identified as: "Lagrange multiplier selection in hybrid video coder control ", Wiegand T; Girod B , PROCEEDINGS 2001 INTERNATIONAL CONFERENCE ON IMAGE PROCESSING. ICIP 2001. THESSALONIKI, GREECE, OCT. 7 - 10, 2001, page 542-545

The prior art describes

a method of performing mode selection in a video compression and encoding system comprising: encoding and decoding with each possible encoding mode; computing a distortion value for each encoding mode; computing a bit rate value for each encoding mode; computing a Lagrangian value for each encoding mode using said distortion value, said bit rate value, and a Lagrangian multiplier wherein said Lagrangian multiplier comprises a slow varying Lagrangian multiplier as a function of a quantization value; and selecting an encoding mode using said Lagrangian values and wherein computing said bit rate value comprises a total number of bits that are necessary to encode a set of motion vectors and a set of coefficients (see paragraph 2, and in particular equation

(1), and paragraph 2, equation (4)).

Consequently, the subject matter of claims 7 and 10 is not new.

1) From the comparison between the said prior art and claim 1, the following technical features of claim 1 can be seen to make a contribution over the prior art (Special Technical Features, Rule 13(2)) PCT):

- The distortion value reduces the effects of outliers.

From these STF the objective problem to be solved by the first invention can be seen as:

How to remove outliers in the distortion values (see description, page 3, line 9).

2) From the comparison between the prior art and claim 13, the following features can be seen to make a contribution over the same prior art:

- Clustering the Lagrangian values and selecting an encoding mode using the Lagrangian values by selecting a mode 0 encoding method if said mode 0 encoding method is in a specific cluster.

From the STF the objective problem to be solved by the second invention can be seen as:

How to achieve bit rate savings (see description, page 7, lines 13 to 15).

The above analysis shows (by comparing the features as described in 1 and 2 above), that the Special Technical Features of invention 1 (claims 1-12) are neither the same nor do they correspond to the features of invention 2 (claims 13-19), as these were described above. A comparison of the objective problem 1 with objective problem 2, seen in the light of the description of the present application, indicates that there is no technical correspondence between these problems nor do they show any corresponding technical effect, so that the special technical features if invention 2 (claims 13-19) fail to demonstrate a correspondence with the special technical features of invention 1 (claims 1-12) as required by Rule 13.1 and 2 PCT.

**Re Item V.**

The following documents are referred to in this communication:

D1 : WIEGAND T ET AL: "Lagrange multiplier selection in hybrid video coder control" PROCEEDINGS 2001 INTERNATIONAL CONFERENCE ON IMAGE PROCESSING. ICIP 2001. THESSALONIKI, GREECE, OCT. 7 - 10, 2001, INTERNATIONAL CONFERENCE ON IMAGE PROCESSING, NEW YORK, NY : IEEE, US, vol. VOL. 1 OF 3. CONF. 8, 7 October 2001 (2001-10-07), pages 542-545, XP010563403 ISBN: 0-7803-6725-1

D2 : MEI-YIN SHEN ET AL: "Fast compression artifact reduction technique based on nonlinear filtering" CIRCUITS AND SYSTEMS, 1999. ISCAS '99. PROCEEDINGS OF THE 1999 IEEE INTERNATIONAL SYMPOSIUM ON ORLANDO, FL, USA 30 MAY-2 JUNE 1999, PISCATAWAY, NJ, USA,IEEE, US, 30 May 1999 (1999-05-30), pages 179-182, XP010341158 ISBN: 0-7803-5471-0

D3: KOSSENTINI F ET AL: "PREDICTIVE RD OPTIMIZED MOTION ESTIMATION FOR VERY LOW BIT-RATE CODING" IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS, IEEE INC. NEW YORK, US, vol. 15, no. 9, 1 December 1997 (1997-12-01), pages 1752-1763, XP000726013 ISSN: 0733-8716

**I    1st INVENTION: Claims 1-12**

**I.1    INDEPENDENT CLAIM 1**

I.1.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject matter of claim 1 does not involve an inventive step in the sense of Article 33(3)PCT.

I.1.1.1    Document D1, which is considered to represent the most relevant state of the art to the subject matter of claim 1, discloses (the references in parenthesis applying to this document):

a method of performing mode selection in a video compression and

encoding system (see abstract), comprising:

encoding and decoding with each possible encoding mode (see paragraph 2, equation (1));

computing a distortion value for each encoding mode (see paragraph 2, equation (1));

computing a bit rate value for each encoding mode (see paragraph 2, equation (1));

computing a Lagrangian value for each encoding mode using said distortion value, said bit rate value, and a Lagrangian multiplier (see paragraph 2, equation (1) ); and

and selecting an encoding mode using said Lagrangian values (see paragraph 2, and in particular equation (1)).

I.1.1.2   The subject-matter of independent claim 1 differs from the disclosure of D1 in that :

Said distortion value reduces the effects of outliers.

I.1.1.3   The problem to be solved by the present invention may therefore be regarded as

How to remove outliers in the distortion values (see description, page 3, line 9).

I.1.1.4   In view of D2 the solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

Document D2 discloses a method for post-processing video encoded data to reduce compression artifacts in low bit-rate coding (see D2, abstract) using a distortion that reduces outliers (see page IV.179, right-handed column, lines 20 to 24).

I.1.1.5   Therefore the features disclosed in D1 and D2 would be combined by the skilled person, without exercise of any inventive skills in order to solve the problem posed. The proposed solution in independent claim 1 thus cannot be considered inventive (Article 33(3) PCT).

I.2   INDEPENDENT CLAIM 7

I.2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 7 is not new in the sense of Article 33(2) PCT. Document D1 discloses (the references in parenthesis applying to this document):

> a method of performing mode selection in a video compression and encoding system (see abstract), comprising:
> encoding and decoding with each possible encoding mode (see paragraph 2, equation (1));
> computing a distortion value for each encoding mode (see paragraph 2, equation (1));
> computing a bit rate value for each encoding mode (see paragraph 2, equation (1));
> computing a Lagrangian value for each encoding mode using said distortion value, said bit rate value, and a Lagrangian multiplier (see paragraph 2, equation (1) ), wherein said Lagrangian multiplier comprises a slow varying Lagrangian multiplier as a function of a quantization value (see paragraph 3, equation (4); and
> and selecting an encoding mode using said Lagrangian values (see paragraph 2, and in particular equation (1)).

The subject matter of claim 7 is therefore not new (Article 33(2) PCT).

I.3   DEPENDENT CLAIMS 2-4, 8,9
Dependent claims 2-4, and 8,9 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT).

Claims 2,9:
The additional technical feature of computing the distortion value using a Huber function is disclosed in prior art D2 (see equation 1 and table 1).

Claim 3:
The additional technical feature of computing the bit rate value using a total number of bits that are necessary to encode a set of motion vectors and a set of

transform coefficients is disclosed in prior art D1 (see page 543, lines 9-12).

Claim 4:

The additional technical feature of using a slow varying Lagrangian multiplier as a function of a quantization value is disclosed in prior art D1 (see equation 4).

Claim 8:

The additional technical feature of the distortion value reducing the effects of outliers is disclosed in prior art D2 (see page IV.179, right-handed column, lines 20 to 24).


## II    2nd INVENTION: Claims 12-19

### II.1    INDEPENDENT CLAIM 13

Document D3, which is considered to represent the most relevant state of the art, discloses

> a method of performing mode selection in a video compression and
> encoding system (see paragraph III), said method comprising:
> encoding and decoding with each possible encoding mode (see paragraph
> III, page 1757, right-hand column, lines 13 to 20);
> computing a distortion value for each encoding mode (see paragraph III,
> page 1757, right-hand column, lines 13 to 20);
> computing a bit rate value for each encoding mode (see paragraph III, page
> 1757, right-hand column, lines 13 to 20);
> computing a Lagrangian value for each encoding mode using said distortion
> value, said bit rate value, and a Lagrangian multiplier (see paragraph III,
> page 1757, right-hand column, lines 13 to 20 ); and
> and selecting an encoding mode using said Lagrangian values (see
> paragraph III, page 1757, right-hand column, lines 13 to 20).

from which the subject-matter of claim 13 differs in that

> a) the Lagrangian values are clustered

b) mode 0 is selected if said mode 0 encoding method is in a specific cluster

The subject-matter of claim 13 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as

How to achieve bit rate savings (see description, page 7, lines 13 to 15).

The solution to this problem proposed in claim 13 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

Document D1 does not teach or suggest clustering the Lagrangian values and selecting an encoding mode using the Lagrangian values by selecting a mode 0 encoding method if said mode 0 encoding method is in a specific cluster. The rest of the prior art does not teach or suggest this feature either.

## II.2 DEPENDENT CLAIMS 14-19

Claims 14-19 are dependent on claim 13 and as such also meet the requirements of the PCT with respect to novelty and inventive step.